

REVISION OF
THE FLORA OF THE BOMBAY PRESIDENCY.

BY

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PART XV

(Continued from p. 900, Vol. XXXIV.)

(With 7 plates).

ARACEÆ (Cke. ii, 816).

BY

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Genera 107. Species 1000.—Tropical and temperate.
Cooke mentions 11 indigenous genera. We add *Rhaphidophora* as new to the Presidency and treat *Colocasias* as an indigenous genus. We are not considering the cultivated species.

Key, partly after Cooke :

A. Flowers 1-sexual, monœcious (often diœcious in *Arisœma*).

I. Water or marsh plants. Spadix without a barren appendix.

1. Floating stemless herbs; leaves forming a rosette-like tuft 1. *Pistia*.

2. Submerged aquatic or marsh herbs

(a) Ovaries in one whorl 2. *Cryptocoryne*.

(b) Ovaries spirally arranged 3. *Lagenandra*.

II. Terrestrial tuberous herbs.

1. Spadix with a barren terminal appendix

(a) Ovules not parietal

i. Male flowers stipitate; flowers often diœcious 4. *Arisœma*.

ii. Male flowers sessile or nearly so; flowers always monoœcious

(1) Flowers and leaves present together

(i) Ovules 1-2, basal 5. *Typhonium*.

(ii) Ovules many, basal and apical. 6. *Therriophonum*.

(2) Flowers appearing before the leaves

(i) Ovules orthotropous; males and females remote; neuters present 7. *Sauromatum*.

(ii) Ovules anatropous; males and females contiguous; neuters 0. 8. *Amorphophallus*.

(b) Ovules many, parietal 9. *Colocasias*.

2. Spadix without a barren appendix; ovules parietal

(a) Female inflorescence adnate to base of spathe, stigma stellate. 10. *Ariopsis*.

(b) Spadix free from the spathe; stigma discoid 11. *Remusatia*.

- B. Flowers hermaphrodite, a few rarely unisexual. Perianth 0.
 Spadix without an appendix, sessile;
 ovary 1—2-celled; berries confluent ... 12. *Rhaphidophora*.
- C. Flowers hermaphrodite. Perianth of 4-6 segments. Spadix without an appendix, flowering upwards, ovary 1-3-celled; stem scandent, leaves distichous ... 13. *Pothos*.

1. PISTIA, Linn.

Species 1.—Tropics and subtropics, with the exception of Polynesia and Macronesia, sometimes ascending up to 5,000 or 5,800 ft., mostly in the plains, sometimes also in somewhat brackish water.

The Bombay plants all belong to the following variety :

Pistia stratiotes, Linn. Sp. Pl. (1753) 963, var. *cuneata* Engl. in Fl. Bras. III, 2 (1879) 214.—*P. stratiotes* Linn.; Roxb. Corom. Pl. III (1819) 63, t. 269; Fl. Ind. III (1832) 131.—*P. crispata* Bl. in Rumphia I (1835) 78.—*Koddapail* Rheede Hort. Malab. XI (1692) 63, t. 32.—*Kianbam kitsii* Rumph. Herb. Amb. VI, 177.

Leaves almost obtriangular, tip rotundate, slightly emarginate, the upper margin slightly crisped or not crisped.

2. CRYPTOCORYNE, Fisch.

Species 40.—Indo-Malayan. Marsh plants.

Cooke mentions 3 species: *C. retrospiralis*, *C. spiralis*, *C. cognata* We add 4 more not known from the Presidency before and describe 2 new ones.

- A. Upper tube of spathe almost absent or much shorter than the lower tube
- I. Leaf-blade broadly lanceolate. Blade of spathe spirally twisted from the base ... 1. *C. Huegelii*.
 - II. Leaf-blade linear-lanceolate or linear-oblancheolate. Blade of spathe more or less spirally twisted from the base
 1. Blade of spathe with the margin entire ... 2. *C. unilocularis*.
 2. Blade of spathe with the margin denticulate
 - (a) Leaves up to 20 cm. long ... 3. *C. spiralis*.
 - (b) Leaves up to 85 cm. long ... 4. *C. tortuosa*.
- B. Lower tube of spathe slightly wider, below the upper tube more or less constricted
- I. Leaf-blade lanceolate to linear-lanceolate, acute at the base, gradually narrowed into the petiole
 1. Blade of the spathe long, linear-lanceolate, spirally twisted along the whole length ... 5. *C. retrospiralis*
 2. Blade of spathe ovate-lanceolate, contracted into a long subulate tail. Tube of spathe shorter than the long caudate lamina ... 6. *C. cognata*.
 - II. Leaf-blade broadly lanceolate-acuminate ... 7. *C. cognatoides*.
- C. Lower tube of spathe narrower than the upper tube and several times shorter; blade broadly ovate-lanceolate, fimbriate-ciliate ... 8. *C. ciliata*.
- Imperfectly known species: Leaf-blade elliptic-lanceolate, acute at both ends ... 9. *C. Dalzellii*.

1. *Cryptocoryne Huegelii*, Schott Aroid. (1853) 8, t. 12; Prodr. (1860) 18; Hook f. F.B.I. vi, (1893) 494; Engler in Engl. Pflanzenr. iv, 23F (1920) 236.

Description : Petioles 15-20 cm. long, vaginate beyond the middle. Leaf-blade oblong-elliptic, narrowed into the petiole, acute at the apex, 15-18 cm. long, in the middle 3-4 cm. broad, primary lateral nerves several on either side, diverging at an acute angle from the midnerve. Peduncle 2-3 cm. long. Tube of spathe 20 cm. long, lower tube narrowly cylindrical, 2.5 cm. long, 0.6-1 cm. wide, upper tube scarcely any, passing over into the blade. Blade linear-lanceolate, long acuminate, about 17 cm. long, 1.5 cm. broad below, inside with transverse, parallel, erose lamellæ, spirally twisted along its whole length. Female inflorescence 4-5-gynous, male 4 mm. long, thinly cylindrical, the interval between the two inflorescences about 1.2 cm. long; appendix short, stout. Ovary oblong, narrowed into a thin style; stigma oblong-oval.

Locality : Savantvadi (Dalgado in Herb. Calc.).

Distribution : The only other specimen is Huegel's No. 2446 in the Hof-museum Herb. Vienna, collected in the East Indies, but no definite locality is given.

2. *Cryptocoryne unilocularis*, (Roxb.) Kunth Enum. iii, (1841) 13; Wight Ic. iii, (1843) t. 774 (non Schott).—*Ambrosinia unilocularis* Roxb. Fl. Ind. iii, (1832) 493.—*Cryptocoryne Roxburghii* Schott Prodr. (1860) 18; Dalz. & Gibs. Bombay Fl. (1861) 257; Hook. f. F.B.I. vi, (1893) 494.—*Arum spirale* Grah. Cat. Bomb. Pl. (1839) 228.

Description : Caudicle about 5 mm. thick; internodes short. Petiole scarcely distinct, broadly vaginate, vagina passing into the blade, blade narrowly linear-acuminate, 20-30 cm. long, 0.5-1 cm. broad, lateral nerves sub-parallel with the midrib. Peduncle very short; lower tube of spathe oblong almost cylindrical, about 1.5 cm. long, 3.5-4 mm. wide, inside purple-spotted, upper tube narrower, 2 mm. wide and scarcely 1 cm. long; blade purple, narrowly linear-lanceolate, spirally twisted. Femlae inflorescence 4-gynous, male about 3 mm. long, separated from the female by a naked interval of about 1 cm.; appendix shortly conical. Ovary elongate-oblong; ovules biseriate. Style short, stigma oval. Capsule unilocular.

Locality : Konkan (Herb. Kew ex Engler).

Distribution : N. Circars, Konkan.

We have not seen any specimens. Roxburgh was the first to mention the plant from India, giving as locality 'Coromandel.' Graham mentions it in his Cat. Bombay Pl., but there is no specimen to confirm his identification. In Dalzell and Gibson's Bombay Fl. the species is mentioned as being common. This statement induces Cooke (Fl. Bomb. II, 819) to doubt its occurrence in the Presidency. It is certainly strange that a plant which is said to be common, should not have been seen during a period of 70 years.

Cooke says that Dalzell has supplied no specimen of this species and Haines has not found any at Kew. Engler mentions the same localities as Hook. f. in the F.B.I., viz., 'the Northern Circars and the Konkan', adding a mistake by including the N. Circars in the W. Ghats of the Malabar Coast. In addition, he gives as source for his information regarding the two localities the 'Herb. Kew.' If he relied on the F.B.I. the next question would arise whether Hook. f. has seen any specimens, and if he has not, why he included Graham's *Arum spirale* and Dalzell and Gibson's *Cryptocoryne Roxburghii* under Schott's *C. Roxburghii*? Their descriptions are certainly not such as to lead unmistakably up to *C. Roxburghii* Schott.

3. *Cryptocoryne spiralis* Fisch. ex Wydler in Linnæa v, (1830) 438; Bl. in Rumphia i, (1835) 84, t. 36 C.; Wight Ic. iii, t. 773; Schott Melet. (1832) 6; Aroid. (1853) 8, t. 13; Schnitzl. Iconog. fasc. iv, (1846) t. 72; Hook. f. F. B. I. vi, (1893) 494; Cke. ii, 818; Engler Pflanzenr. iv, 23 F (1920) 237.—*Arum spirale* Retz. i, (1779) 30; Bot. Mag. t. 2220; Lodd. Bot. Cab. t. 525.—*Ambrosinia spiralis* Roxb. Hort. Beng. (1814) 65; Fl. Ind. iii, (1832) 492.

Description : Caudicle 10-20 cm. long or longer, about 4-5 mm. thick, stoloniferous; internodes 1-1.2 cm. long. Petiole scarcely distinct, broadly vaginate, vagina passing over into the blade; blade linear-lanceolate, 10-15 cm. long, 8-12 mm. broad, long-narrowed from the middle to the base; lateral nerves ascending towards the apex. Peduncle very short, included together with the tube in a sheath. Lower tube of the spathe, including the inflorescence, obconical, about 2 cm. long, almost 1 cm. wide above, 7-8 mm.

below ; upper tube scarcely any ; blade purple, linear-lanceolate, 10 cm. long or longer, below more than 1 cm. broad, within strongly transversely lamellate, with a denticulate margin, purple, at first twisted, finally straight. Female inflorescence 5-gynous, male one 3-4 mm. long, separated from each other by a naked interval of about 8 mm. ; appendix shortly conical, 1.5 mm. long. Ovaries oblong, narrowed into a short, outward-bent style ; stigma broadly elliptic.

Locality : Khandesh : Bhusawal (Gammie !).—Konkan (Dalzell, Stocks).—Deccan : Poona (Herb. Econ. Bot. !).—N. Kanara : Santgul (Talb. 860 ! Herb. Calc.) ; Siddhapur in rice fields, 1,500 ft., rainfall 100 in. (Sedgwick 7066 !, 7066b !).—It grows on the margins of ditches and ponds and in rice fields, submerged during the rains.

Distribution : From Khandesh to N. Kanara, Calicut, Coromandel Coast, Pondicherry, Bengal, E. Bengal, Ceylon.

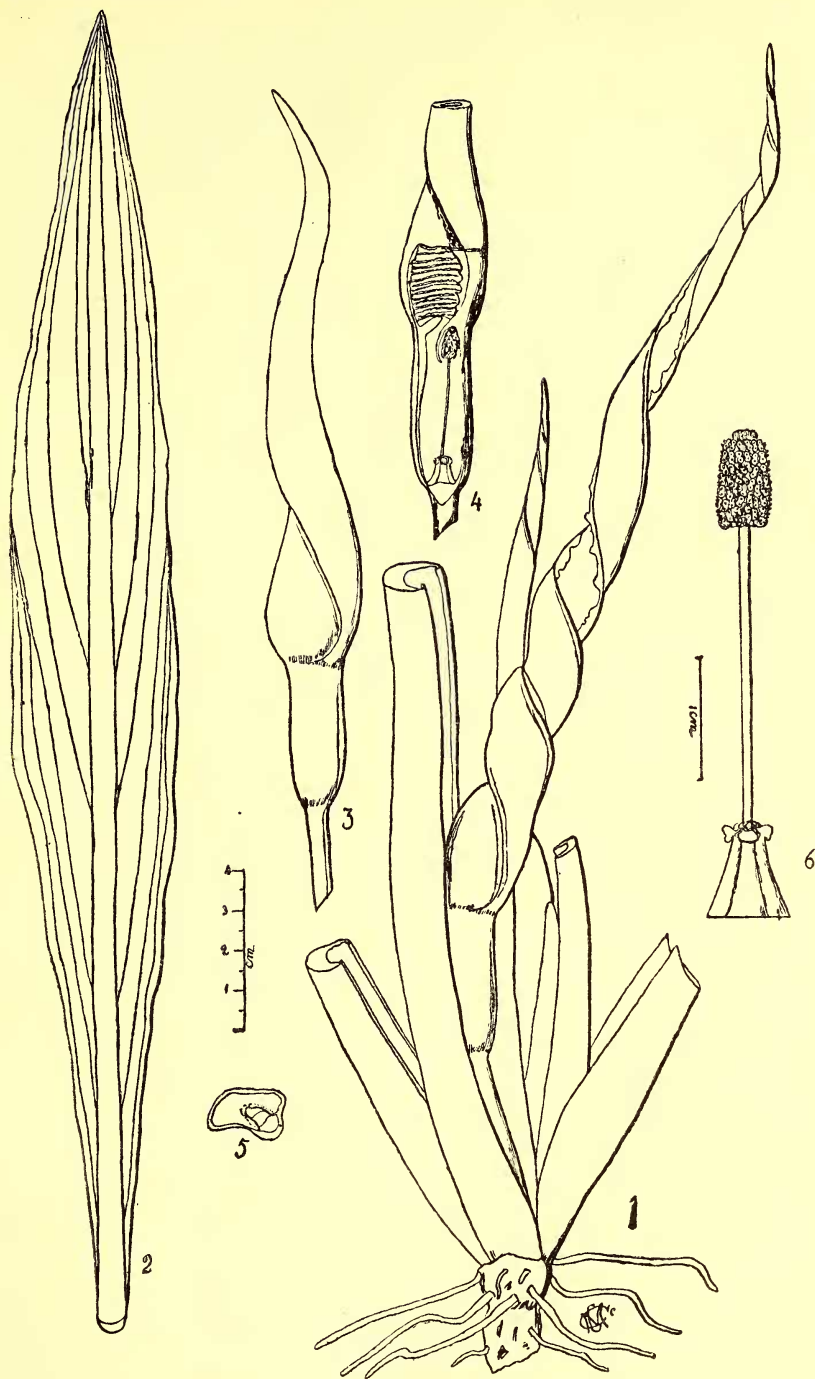
Flowers : Nov. (Poona) ; Dec. (Bhusawal).

4. *Cyrtocoryne tortuosa*, Blatter & McCann *sp. nov.* [*Pertinet ad sectionem Unitubularum* Engl. *Accedit ad C. Huegelii* Schott sed differt lamina foliorum lineari-lanceolata vel lineari-oblancoolata, foliis duplo longioribus pedunculo longiore, spathe multo longiore, spathe lamina coriacea margine denticulata inferne 8.5 cm. lata intus rugosissima, inflorescentia mascula longiore, interstitio inter inflorescentiam femineam et masculam maiore, stigmate discoideo margine sinuato, appendice minime truncata.]

A tall tufted herb. Rhizome 1.5 cm. thick, descending perpendicularly and getting thinner, with very long vermiform roots. Leaves including petioles up to 85 cm. long, upright, upper part of lamina slightly recurved. Petioles vaginate at base for about 20 cm., then deeply channelled with sharp edges for about 25 cm., fleshy, spongy, striate, 8 mm. diam. from dorsal to ventral side, 1.5 cm. from side to side, purple or pale green tinged with purple. Lamina slightly inequilateral, up to 40 cm. long and 6.5 cm. broad where broadest, dark green above, paler beneath, linear-lanceolate or linear-oblancoolate, apex acute or acuminate or subobtuse, sometimes apiculate, margin entire, very narrowly hyaline, undulate ; midrib very stout, semicylindrical, 5-7 mm. diam., striate, slightly depressed above, very prominent below, light green and striate with purple below ; lateral nerves 3 at base on either side running up for $\frac{3}{4}$ the length of the blade and disappearing into the margin, besides 3-7 on either side starting at different heights and running into the tip, all depressed above, prominent beneath, and communicating by transverse veins. Peduncle up to 8 cm. long, 8 mm. diam., cylindrical, slightly compressed, slightly thicker upwards, enclosed by a cataphyll and the vagina of a leaf. Cataphyll linear, membranous, 12 cm. long, 1 cm. broad, margins slightly incurved, tip rounded. Tube of spathe underground. Spathe up to 27 cm. long. Tube white or tinged with red purple, trigonous-cylindrical, flattened on the ventral side, convex on the dorsal 4 cm. long, 1.5 cm. broad transversely. Lamina thickly fleshy-coriaceous, stiff, brittle, lanceolate, long acuminate-caudate, 23 cm. long, up to 8.5 cm. broad at base, dark purple on both sides, spirally twisted from the base either to the left or the right (in bud the spathe is not twisted, then the lower part becomes twisted and in flower the whole blade, and finally it uncoils without spreading out entirely), lower part of blade very strongly rugose inside, diminishing upwards, the ridges in the lower part 2-3 mm. high, transverse, more or less parallel, purple, except sometimes for the lowest cm. yellowish ; margins of blade before opening out kept together by a row of teeth on each margin which are about 2-4 mm. long. Spadix 3.3 cm. long. Female inflorescence 6 mm. long, at base 7 mm. diam. ; ovaries 6, verticillate, connate ; stigmas irregularly discoid, cream-coloured, very minutely papillose, with the margins undulate and tinged with purple. Nude part of spadix between male and female inflorescences 2 cm. long, filamentous cream-coloured. Male inflorescence 7 mm. long, 3.5 mm. diam., cylindrical, yellow. Flowers diandrous. Stamens very short. Tip of spadix adnate to the septum of the spathe. Appendix white, truncate, about 1.5 mm. broad, scarcely 1 mm. long.

Locality : W. Ghats : Edge of a ditch at Lingmala near Mahableshwar, alt. 4,000 ft. (McCann 3331 ! type, 3335 !, 3336 !, 3340 !, co-types).

Flowers : 24th September 1930.



Cryptocoryne tortuosa Blatter & McCann, sp. nov.

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|----------------------------|---|
| 1. Plant with open flower. | 4. Section of flower. |
| 2. Leaf. | 5. T. S. showing septum with valve in tube. |
| 3. Bud. | 6. Spadix. |



Cryptocoryne cognatoides, Blatter & McCann, sp. nov.

5. *Cryptocoryne retorspiralis* (Roxb.) Fisch. ex Wydler in Linnæa v, (1830) 428; Kunth Enum. iii, (1841) 12; Wight Ic. iii, t. 772; Cke. ii, 818.—*Ambrosinia retorspiralis* Roxb. Fl. Ind. iii, (1832) 492.

Description : Cke. i, 818.

Locality : *Konkan* : Bombay (Law) ; banks of the Pen River (Law) ; beds of rivers (Gibson) ; river-bed near Mira (Gibson 151).—*Deccan* : Poona, on river-banks (Perrotet, Ranade! Herb. Econ. Bot.!) ; Ganeshkhind Bot. Gard. (Patwardhan!).—*N. Kanara* : Nugi (Talbot 1583!, Herb. Calc.) ; Arbaal (Talbot!).

Distribution : Konkan, Deccan, N. Kanara, Mysore, Travancore, Carnatic, Godavari District, Chota Nagpur, E. Bengal, Assam, Burma.

Flowers : Jan. (N. Kanara).

6. *Cryptocoryne cognata* Schott in Bonplandia, v, (1857) 222 ; Hook. f. F. B. I. vi, (1879) 494 ; Cke. ii, 819 ; Engler Pflanzenr. iv, 23F (1920) 247.

Description : Cke. ii, 819.

Locality : *Konkan* (Stocks). So far endemic.

7. *Cryptocoryne cognatoides* Blatter & McCann *sp. nov.*

[*Pertinet ad sectionem Bitubulosarum* Engler. *Accedit ad C. cognatam* Schott a qua tamen differt radice non tuberosa, foliorum laminis late lanceolato-acuminatis, basi acutis, vel cuneatis, vel rotundis vel subcordatis, nervatione, pedunculis multo longioribus.]

Herba rhizomate prædita 0·7 cm. crasso (non bulboso). *Foliorum petioli* 20 cm. attingentes vaginali ; *lamina* late lanceolato-acuminata 20 cm. attingens, medio 2·3 cm. lata basi acuta, vel cuneata, vel rotundata vel subcordata, margine undulata, nervi 3 centrales a basi foliorum usque apicem currentes, laterales utrinque 3 adscendentes deinde in apicem exeuntes. *Pedunculus* 5·5·5 cm. longus. *Spathæ tubus* 5 cm. longus, inferne 7 mm., superne 5 mm. amplius, lamina late elongato-lanceolata, 5·2 cm. longa, minime tortuosa, intus transversaliter rugosula. *Spadicis inflorescentia* feminea 5·5 mm. longa, mascula vero ca. 4 mm. longa, ambæ interstitio 2·2 cm. separatæ ; appendix conicus, brevissimus.

Locality : N. Kanara : In running water (T. R. D. Bell 3091! type, 3091a! 3091b! co-types).

Flowered in October 1917.

8. *Cryptocoryne ciliata* (Roxb.) Fisch. ex Wydler in Linnæa v, (1830) 428 ; Schott Melet. i, (1832) 26 ; Bl. in Rumphia i, (1835) 85 ; Wight Ic. iii, (1840-56) t. 775 ; Hook. f. F. B. I. vi, (1893) 492.—*Ambrosinia ciliata* Roxb. Corom. Pl. vii, (1819) 90, t. 294 ; Fl. Ind. iii, (1832) 491.—*Cryptocoryne elata* Griff. Not. iii, (1851) 434 ; Ic. Pl. As. (1851) t. 170, 171 (*alata*).

Description : Caudicle 1-2 cm. thick, stoloniferous ; internodes very short, roots numerous, sometimes a longer internode between a series of shorter ones. Petioles 10-30 cm. and longer, 4-6 mm. thick, glabrous or papillulose, broadly (up to 2·5 cm.) sheathing. Blade above deep green (except the midrib), oblong-lanceolate or linear-lanceolate, inequilateral, 15-35 cm. long, 2-9 cm. broad, oblique at the base, acute or acuminate at the apex, midrib 3-5 mm. thick, very prominent on both sides, primary lateral nerves several on each side, scarcely prominent, passing away from the midrib at an acute angle. Peduncle very short, in fruit sometimes 5-6 cm. long ; lower tube of spathe 1·5-2 cm. long, scarcely 1 cm. wide, upper tube 15-30 cm. long, 5-6 mm. wide, split at the apex, outside glabrous and dirty greenish, inside almost white, granulate towards the blade with many reddish papilli ; blade ovate-oblong, 5-6 cm. long, 1·5-3 cm. broad, cuspidate, densely fimbriate with lacinia 5-6 mm. long and slightly crisped, at the throat with a yellowish ovate spot about 2 cm. long, otherwise purple. Female inflorescence about 5-7-gynous, 1 cm. long, covered by an ovate process of the spathe and separated by an interval of almost 1 cm. ; appendix shortly broad-conical, about 3 mm. long, 4 mm. thick below. Ovary 8 mm. long, several-seeded ; ovules biseriate, narrowed into a short outward-bent style ; stigma linear-oblong. Syncarpium ovoid-globose, 3-4 cm. wide, 5-7-sulcate and crowded with 5-7 remnants of the styles, 5-7-locular, valvately dehiscent ; cells 3-8-seeded, germinating in the fruit.

Locality : *Western Ghats* (T. Cooke! Herb. Calc.).

Distribution : Mysore, Coromandel, Carnatic, Calcutta, Sunderbunds, Malay Peninsula and Archipelago.

9. *Cryptocoryne Dalzellii* Schott in Bonplandia v, (1857) 221 ; Engl. Pflanzenr. iv, 23F (1920) 248 ; Cke. ii, 819 (*sub specie dubia*).

Description : Imperfectly known : Blade of leaf lanceolate, epetiolate, apparently amplexicaul, the margin transparent and finally crenated ; veins parallel ; surface woolly as if covered densely with cobweb (Dalzell). Fruit ovoid, about 12 by 8 mm., on a solitary stalk ; seeds biseriate, oblong, subtrigonous.

Locality : 'Bombay' (Dalzell, Herb. Kew).

3. LAGENANDRA Dalzell.

Species 5.—India, Ceylon.

1. *Lagenandra ovata* (Linn.) Thwait. Enum. Pl. Zeyl. (1864) 334 ; Engler Pflanzenr. iv, 23F (1920) 228, fig. 57, 58.—*Arum ovatum* Linn. Sp. Pl. (1753) 967, ed. 2 (1763) 1371.—*Caladium ovatum* Vent. in Rømer Arch. ii, (1801) 357.—*Cryptocoryne ovata* Schott Melet. i (1832) 6.—*Lagenandra toxicaria* Dalz. in Hook. Journ. Bot. iv, (1852) 289, v, (1853) t. 4 ; Dalz. and Gibs. Bomb. Fl. (1851) 257 ; Cke. ii, 819.

Description : Cke. 1 c.

Note : Leaves black in the shade, appressed to the ground (Sedgwick).

Locality : *Konkan* : In marshes (Dalzell) ; Bombay (Dalzell ! Herb. Calc.) ; Niwendi river bank, Ratnagiri Dist. (Garade ! Herb. Econ. Bot. Poona).—*S M Country* : Belgaum (Dalzell). *N. Kanara* : Yellapore (Talbot 1813 ! Herb. Econ. Bot. Poona) ; in streams and marshy places (Talbot 1012 ! Herb. Econ. Bot. Poona) ; in a stream above Malamani Ghat (Sedgwick and Bell 7201 !) ; Anmod, in nala (Sedgwick 3314 !) ; Arbai Ghat (Sedgwick 3459 !).

Distribution : From the Konkan to N. Kanara, Mysore, Coorg, Cochin, Travancore, Ceylon.

Flowers : Jan. and March (N. Kanara) ; May (Ratnagiri).

Fruit : Oct., Nov., Dec. (N Kanara).

4. ARISÆMA Mart.

Species 105.—Asia, Abyssinia, America.

Cooke has 4 species. We add 1 new to the Presidency : *A neglectum*, and describe a new species : *A. longicaudatum*.

A. Appendix of spadix not exerted beyond the spathe

I. Leaflets sessile.

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|---|------------------------------|
| (a) Appendix of spadix tapering from the base to the tip | 1. <i>A. Murrayi</i> . |
| (b) Appendix of spadix narrowly clavate | 2. <i>A. Leschenaultii</i> . |

II. Leaflets petiolulate with thread-like tips.

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|----------------------------------|------------------------------|--|--|
| Spathe with a caudate tip. | | | |
| (a) Appendix 1.5 cm. long | 3. <i>A. caudatum</i> . | | |
| (b) Appendix 4 cm. long | 4. <i>A. longicaudatum</i> . | | |

B. Appendix of spadix far exerted beyond the spathe

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|------------------------------|--------------------------|
| I. Leaves pedatisect | 5. <i>A. tortuosum</i> . |
| II. Leaves radiatisect... .. | 6. <i>A. neglectum</i> . |

1. *Arisæma Murrayi* (Graham) Hook. in Bot. Mag. (1848) t. 4388 ; Cke. ii, 821.

Description : We give a more complete description of this species from live material: Tubers hemispheric, up to 5 cm. diam., root-fibres crowded, arising from the upper side of the tuber, fleshy, white, rather tough. Sheaths broadly linear-oblong, or oblong-lanceolate, mucronate, lowest white, tipped purple, the others pale or dark purplish, the uppermost up to 30 cm. long, the lower much shorter. Leaf one, coming up shortly after the peduncle, but co-existent with the flower and finally reaching higher than the flower, peltate, glossy dark green on the upper surface, paler and shining beneath, divided to the base into 5-11 segments. Segments sessile, ovate-lanceolate-acuminate

or oblong-lanceolate-acuminate or obovate-lanceolate, cuneate at base, with 2 intramarginal nerves, the outer faint, the inner distinct and about 1 cm. from the outer, otherwise penninerved, the nerves from the midrib meeting the inner intramarginal nerve, all the nerves depressed on the upper surface and very prominent on the lower, the central one very pale green, margin either entire or dentate-sinuate and wavy, length from 6-15-45 cm., breadth 4-6-15 cm., acumen 1.5 cm. Petiole 30-90 cm. long, 2 cm. diam. below, 1 cm. near lamina (in a specimen 60 cm. high), cylindrical, striate, stout green or purplish-red or greenish-purple or green streaked with purple, sheathed for one half or less. Peduncle 30-90 cm., green or purple, cylindrical, thinner than the petiole, and slightly thinner towards the apex, shorter or longer than the peduncle. Spathe striate, up to 14 cm. long, tube cylindrical, 2.5-6 cm. long, 1-3 cm. wide, grass-green inside and outside with white striae, especially upwards, slightly constricted at top and there broadening into a broadly ovate-acute or ovate-acuminate, somewhat cucullate limb, limb up to 11 cm., incurved, sometimes at a right angle, at other times at 45° to the axis, pure white or sometimes with a green band or blotches along the centre, purple inside and outside where it meets the tube, the purple sometimes very faint or absent, especially outside, veins many, parallel, very distinct outside, faint inside, acumen mostly tinged with a bright green. Spadix narrowed from the base upwards, conical; appendage very variable 3-7 cm. long, greenish at base, becoming deep purple above and lighter in colour at the tip, exserted. (We have not seen it included in the tube), following more or less the bend of the limb, tapering to a fine point. Spadix androgynous or unisexual. Androgynous spadix: Female flowers below, crowded, covering about 2-3 cm. of the conical axis; ovaries arranged in many parallel spirals, sessile, style very short, stout, stigma disk-shaped, white; then follows an empty space of 3-4 mm. or the male flowers follow immediately, covering 1.2-5 cm. of the spadix, consisting of groups of 3-8, mostly 6 anther-lobes on a common very short stalk, sometimes a few subulate neuters above the anthers. Male spadix: Anther-bearing part up to 3 cm. long, 2-7, mostly 4 anther-lobes on a common stalk about 2 mm. long, globose or shortly ovoid, opening by a slit on top. Female spadix never seen. Ovaries when ripe, bright red, variously compressed.

Fruiting specimens showed the following measurements:

Tuber 8 cm. diam., whitish inside, producing young tubers from the upper side.

Petioles 80 cm. long; leaflets 27 by 13 cm.

Fruiting inflorescence first green, then yellow and finally red, up to 8.5 cm. long, 3.5 cm. wide. Styles persistent.

There is usually 1 leaf to a plant, 2 are not uncommon, 3 are rare.

The anthers are faintly scented.—The plants with male spadices are generally only half the size of those with androgynous spadices.

Locality: Gujarat: Bansa Hill S. W. of Surat (Law).—*Konkan* (Stocks); Ambenali (McCann!) Matheran (Cooke!).—*W. Ghats:* Khandala (McCann!), Sedgwick 2616!, Bhiva!); Panchgani, very common (Blatter and McCann!); Mahableshwar, fairly common (Cooke!, Blatter!); Sinhadgad (Woodrow); Igatpuri (McCann!) Purandhar (Bhiva!).—*Deccan:* Satara (Talbot 3385!).

Distribution: Gujarat, Konkau, Deccan, W. Ghats, Nilgiris.

Flowers: July 1917 (Khandala), 7th July 1925 (Panchgani), 1st July 1925 (Panchgani), after first rains 1925 (Panchgani), Aug. 1894 (Satara).

Fruit: 25th Oct. 1917 (Igatpuri), Sept. 1917 (Igatpuri).

2. *Arisæma Leschenaultii* Bl. in Rumphia i, (1835) 93; Cke. ii, 821.—*A. Huegelii* Schott. Syn. 27; Prodr. 44.—*A. papillosum* Steud. ex Schott Prodr. (1860) 46; Hook. in Bot. Mag. t. 5496, *excl. syn. erubescens*.

Description: Cke. ii, 821.

Locality: Cooke mentions the W. Ghats and the S. M. Country between Ramghat and Belgaum. He has not seen any specimens. We doubt the occurrence of this species in the Presidency.

Distribution: Nilgiris, Travancore, Ceylon.

3. *Arisæma caudatum* Engl. in DC. Mon. Phan. ii, (1879) 559; Pflanzenr. iv, 23 F. (1920) 183; Hook. f. F.B.I. vi, (1893) 508; Cke. ii, 822.

This is a species only partly known. Hooker f. (F.B.I. vi, 508) had seen no specimen and described it from a drawing by Stocks who had seen the plant in

the Konkan. Engler described the species, as he says himself, from a badly dried specimen. We reproduce Engler's description which is more complete than either Hooker's or Cooke's. It may help future botanists to identify the plant in the field.

Description: Leaf solitary. Dioecious (Hooker and Cooke speak of the spadix as androgynous). Petiole stout, narrowly sheathed; blade radiatisect; segments 7, oblong-elliptic, long and very narrowly acuminate, ending in an aristiform 1-1.5 cm. long tip, shortly cuneate at the base, 15-17 cm. long, the middle segment 5 cm. broad, the lateral ones narrower, lateral nerves archingly ascending at an acute angle, 7-9 mm. distant from each other, united into an intramarginal nerve 2-3 mm. inside the margin. Peduncle much shorter than the petiole. Tube of spathe long-infundibuliform, 6-7 cm. long, above 2 cm. diam., margin of the throat slightly recurved, blade erect, oblong-lanceolate, about 8 cm. long, 3 cm. broad below, contracted into a narrow linear tail 8 cm. long. Inflorescence of spadix about 5 cm. long; appendix stipitate, thickened at the base; only 1.5 cm. long.

This plant has not been observed since Stock's time.

4. *Arisæma longicaudatum* Blatter in Journ. As. Soc. Beng. (1930) 362 (*per errorem longicaudata*).

Description: Whole plant reaching 1 m. and more, as a rule dioecious. Tuber depressed-globose; root-fibres numerous, from the upper side of the tuber, less tough than in *A. Murrayi*. Leaf solitary, peltate; petiole stout, straight, up to 60 cm. long, cylindric, smooth, shining, green and purple-marbled; leaflets generally 6, whorled, petiolulate with petiolules 5 mm. long, very variable even in the same leaf, obovate-cuneate or broadly lanceolate or oblong-lanceolate, all caudate-acuminate, with acumination up to 4 cm. and capillary towards end, dark green above, paler beneath, shining, up to 22 cm. by 9 cm., intramarginal veins 2, nerves depressed above, prominent beneath. Peduncle up to 40 cm. cylindric, thinner than petiole, of the same colour, but green near top. Male spathe up to 30 cm. long, grass-green throughout, striped externally with white; tube elongate-cylindric, up to 8 cm. long, 2 cm. diam., widening into an ovate-lanceolate, long caudate-acuminate limb, 7 cm. long (without acumen) and 4 cm. broad, slightly reflexed near the tube, acumen 13 cm. long; limb deflexed, pendulous. Male spadix up to 9 cm. long, exerted from the tube for 1 cm., conical in the flower-bearing part which is about 5 cm. long, appendix about 4 cm. long, straight, slightly thickened at the base, then more or less uniformly cylindric, blunt at tip. Stamens white; filaments stout, about 2 mm. long, usually 3 united carrying 6, sometimes 7-8 anther-lobes which are shortly ovoid or globular. Female spathe up to 45 cm., tube 10 by 2.5 cm., limb (without acumen) 13 by 6 cm., acumen 22 cm. Female spadix: Flower-bearing part about 5.5 cm. long, above female flower some neuters for 5 mm., appendix 4 cm. long, like male. Female flowers arranged in many parallel dense spirals. Ovaries spherical or shortly oblong, green, unilocular. 1-3-ovuled; style very short, stout, green, stigma disk-like, white, covered with crystalline protuberances. Neuters above the female flowers up to about 17, subulate.

Here are a few measurements of a plant in fruit taken towards the end of August 1930 at Mahableshwar.

Leaflets (including tail) 43 cm. by 12.5 cm. Fruiting spadix up to 14 cm. long, 4.5 cm. diam. below, conical, some neuters persisting at top of cone. From the upper side of the tuber several young tubers arise. Tuber whitish green inside. Some fruiting specimens growing in rock-crevices at Panchgani had the petioles 1.2 m. in length, and peduncles 95 cm. long.

Abnormalities: In a female spadix (call it incipient or atavistic androgynous spadix) were noticed above the female flowers 2 male flowers, each consisting of 2 filaments united below and free above, each filament with 2 distinct white anther-lobes separated from each other by a broad green connective.

Mixed with the neuters of a female spadix the following were observed:

(a) One bisexual flower on 2 pedicels united at the base: one pedicel bearing an undeveloped ovary and well-developed style, the other pedicel one complete anther.

(b) Some male flowers: 1 filament with an anther-lobe.

(c) Some male flowers: 1 filament with a complete anther and connective.



1. *Cryptocoryne tortuosa*, Blatter & McCann, sp. nov.
(*In foreground near water*).



2. *Arisæma longicaudatum*, Blatter & McCann, sp. nov.
(*Photos by C. McCann.*)

Flowers and leaves seen at the same time. Spathe usually reaching to up below the leaf, the leaf thus protecting the flower; the spathe is never higher than the leaf. The spathes turn pale and then yellow.

Locality: Mahableshwar, very common (Blatter P. 10!, P. 10*a-e*!, McCann!); Panchgani, very rare, only found in a few rock crevices (Blatter!, McCann!, May Langham!).

5. *Arisæma tortuosum* (Wall.) Schott Melet. i, (1832) 17; Hook. f. F.B.I. vi, (1893) 502; Cke. ii, 820.—*Arum tortuosum* Pl. As. Rar. ii, (1830) 10.

Description: Cke. ii, 820.

This is a most variable plant regarding the size, number and breadth of the segments. The inflorescence of the spadix may be monoecious or dioecious. The proportion of the male and female inflorescences, too, varies a good deal in the androgynous spadices. The length of the appendix and the colour of the spathe are not constant either.

Locality: *Konkan* (Stocks).—*W. Ghats*: Khandala (Chibber!).—*S. M. Country*: Tavargatti (Sedgwick 2632!, 2643!).—*N. Kanara*: Karwar (Talbot 514!, Bell 6107!).

Distribution: Chamba, Garhwal, Nepal, Sikkim, Khasia Hills, Burma, Central Provinces, Nilgiris.

Flowers: June 1883 (Karwar), June 1907 (Khandala), July (S. M. Country).

Fruit: Oct. (Karwar).

6. *Arisæma neglectum* Schott in Bonplandia vii, (1859) 26; Hook. f. F.B.I. vi, (1893) 504; Engler Pflanzenr. iv, 23 F. (1920) 192, fig. 43.—*A. filiforme* Thw. Enum. (1864) 334 (*non* Blume).—*A. Wightii* Bot. Mag. (1865) t. 5507 (*non* Schott).

Description: Leaves 2 or 1. Monoecious or dioecious. Tuber globose, young plants budding off from it. Cataphylls tubular below, above broadly linear, obtuse, obscurely spotted like the sheaths of the petioles, the uppermost about 15 cm. long. Petioles 20–40 cm. long, sheathed up to the middle or far beyond it; lamina 5- (sometimes 4-) to 7-radiatisect, segments elliptic or lanceolate-elliptic or lanceolate, shortly cuspidate-acuminate, cuneate at the base, sessile, with undulate margin, the intermediate one up to 10 cm. long or slightly longer, in the middle 4 cm. broad, the lateral ones slightly smaller, lateral nerves 5–7 mm. distant from each other and united into an intramarginal nerve 3–4 mm. away from the margin. Peduncle longer than the petioles, 30–40 cm.; tube of spathe pale green, cylindrical, 2–3 cm. long, throat slightly constricted with the margins subrevolute, lamina green, with lighter longitudinal stripes, ovate- or oblong-lanceolate, 5–6 cm. long, 2 cm. broad, long acuminate. Spadix of unisexual or androgynous inflorescence about 2 cm. long, green or dark purple, conical; appendix as thick below as the axis of the inflorescence, getting thinner upwards, sigmoidally curved. Male flowers sessile, with 2–3 stamens; anther-lobes ovoid, dehiscing by a longitudinal slit.

Locality: *Konkan*: Hills N.-W. of Mulland, Salsette, in deciduous forests (McCann 1643!, 1644!, 1645!, 1646!, 1647!, 1648!, 1649!).—*N. Kanara* (Talbot 514!, 1258!).

Distribution: *Konkan*, *N. Kanara*, Nilgiris, Ceylon.

5. TYPHONIUM Schott (Cke. ii, 822).

Species 25.—Indo-Malayan.

Cooke mentions 2 species: *T. bulbiferum* and *T. cuspidatum*. We add *T. amboinense* and *T. trilobatum* and describe a new species. *T. cuspidatum* has to cede to *T. flagelliforme*.

- I. Lower rudiments of sterile flowers clavate, upper ones subulate or only verruciform ...

 - 1. Spathe more or less straight and upright ... 1. *T. flagelliforme*.
 - 2. Spathe bent downwards above the tube ... 2. *T. incurvatum*.

- II. Rudiments of sterile flowers never clavate.

 - 1. Leaves bulbiferous at the apex of the petiole. ... 3. *T. bulbiferum*.
 - 2. Leaves not bulbiferous ...

 - (a) Appendix of spadix red or red-fulvous, very shortly or scarcely stipitate ... 4. *T. trilobatum*.
 - (b) Appendix of spadix black-purple, longer stipitate ... 5. *T. amboinense*.

1. *Typhonium flagelliforme* (Lodd.) Bl. in Wall. Cat. (1832) 8931; Engl. Pflanzenr. iv, 23 F (1920) 112, fig. 16.—*Arum flagelliforme* Lodd. Bot. Cab. (1819) t. 396; Roxb. Fl. Ind. iii, (1832) 502; Wight. Ic. iii, (1843) t. 791.—*Heterostalis flagelliformis* Schott in Österr. bot. Wochenbl. vii, (1857) 261, Gen. Ar. (1859) t. 18.—*Arum cuspidatum* Bl. Cat. Gew. Buitenz. (1823) 101.—*Typhonium cuspidatum* (Bl.) Decaisne Herb. Timor in Ann. Hist. Nat. iii, (1834) 39; Bl. Rumphia i, (1835) 133. t. 30, f. 1-3; Hook. f. F.B.I. vi, (1893) 511; Cke. ii, 823.—*Nelenshena major* Rheede Hort. Mal. ii, (1679) t. 20.—*Arum angulatum* Griff. Nottul. iii, (1831) 143.—*A. ptychiurum* Zipp. ex Kunth Enum. iii, (1841) 26.—*Typhonium hastiferum* Miq. Fl. Ind. Bat. iii, (1855) 194.—*T. Reinwardtianum* de Vriese et Miquel Fl. Ind. Bat. iii, (1855) 195.

Description: Cke. ii, 823.—A correction is necessary. Cooke says that the neuters above the male inflorescence are subulate. It should read below the male inflorescence, as there are no neuters above it.

Hook. f. (F.B.I. vi, 512) calls the spathe 'lurid red, papillose within.' Hallberg notes that in the plant from Parel the spathe was green and not papillose. Engler says that the tube of the spathe is green and the limb white.

We found the ovaries whitish (Cooke greenish), the lower neuters pale green with chocolate bifid tips (Cooke purple headed), the upper neuters whitish, the stamens yellow, the appendix of the spathe olive green or yellowish.

Locality: Konkan : Parel in Bombay Isl. (Ranade!, Cooke!, Hallberg!); Salsette (Hallberg!).

Distribution: Konkan, Travancore, Ceylon, Bengal, Burma, Malay Peninsula. Cochín-China, Laos, Cambodia, Tonkin, Java, Timor.

Flowers: Aug., Sept. 1892 (Parel).

2. *Typhonium incurvatum* Blatter & McCann, *sp. nov.* [Araceæ].

Tuber globosus, vix depressus, 3 cm. diametens. Foliorum petioli tenues, canaliculati, ca. 20 cm. longi, basi equitantes; lamina viridis supra, pallidior infra et glauca, forma et magnitudine variabilis, sagittata vel hastato oblonga, a basi cordata et triloba, usque 10 cm. longa, medio 5 cm. lata, nervi depressi in facie superiore, prominentes in inferiore, lobi basales valde variabilis, absentes vel usque 2.5 cm. longi et 2 cm. lati. Pedunculus 3 mm. crassus, 7 cm. longus; spathæ tubus viridis, ovoideus, superne profunde constrictus, 2 cm. longus; lamina dilute viridis, ovata, circa inflorescentiam masculam et appendicem sursum incurvata, transversaliter saccata, in flagellum 8 cm. longum et 4 mm. latum prolongata, apice acuta, a basi 5-nervosa, nervo centrali in apicem excurrente. Spadix ca. 5 cm. longa; inflorescentia feminea 6 mm. longa, cylindrica, alba florum sterilium inferiorum rudimenta claviformia apice depressa, purpurea, ca. 2 mm. longa, superiorum subuliformia, deflexa, albidia; feminea inflorescentia a mascula interstitio ca. 13 mm. longo separata; inflorescentia mascula cylindrica, 5 mm. longa, 2.5 mm. diametens, flava. Spadicis appendix brevissime stipitata, inferne constricta, elongato conoidea (minimè filiformis), 2.7 cm. longa, flavescens. Pistilla ovoidea, apiculata. Inflorescentia feminea in fructu elongato-ovoidea, cooperta spathæ tubo permanente, quadrangularis. Pedunculus elongatus. Bacca oblongo-obovoidea, monosperma. Semen oblongum, aliquantulum latius in parte superiore, rugulosum, apice apiculatum.

Locality: Konkan : Sion in Bombay Isl., foot of W. slope of hill (McCann 998! type, 999! 1000!, 1001! co-types).

Flowers and Fruit: 25th Aug. 1929.

3. *Typhonium bulbiferum* Dalzell in Kew Journ. Bot. iv, (1852) 113; Hook. f. F.B.I. vi, (1893) 511; Cke. ii, 822; Engler Pflanzenr. iv, 23 F. (1920) 116, fig. 15 S-V.

Vern. name: Rantiri.

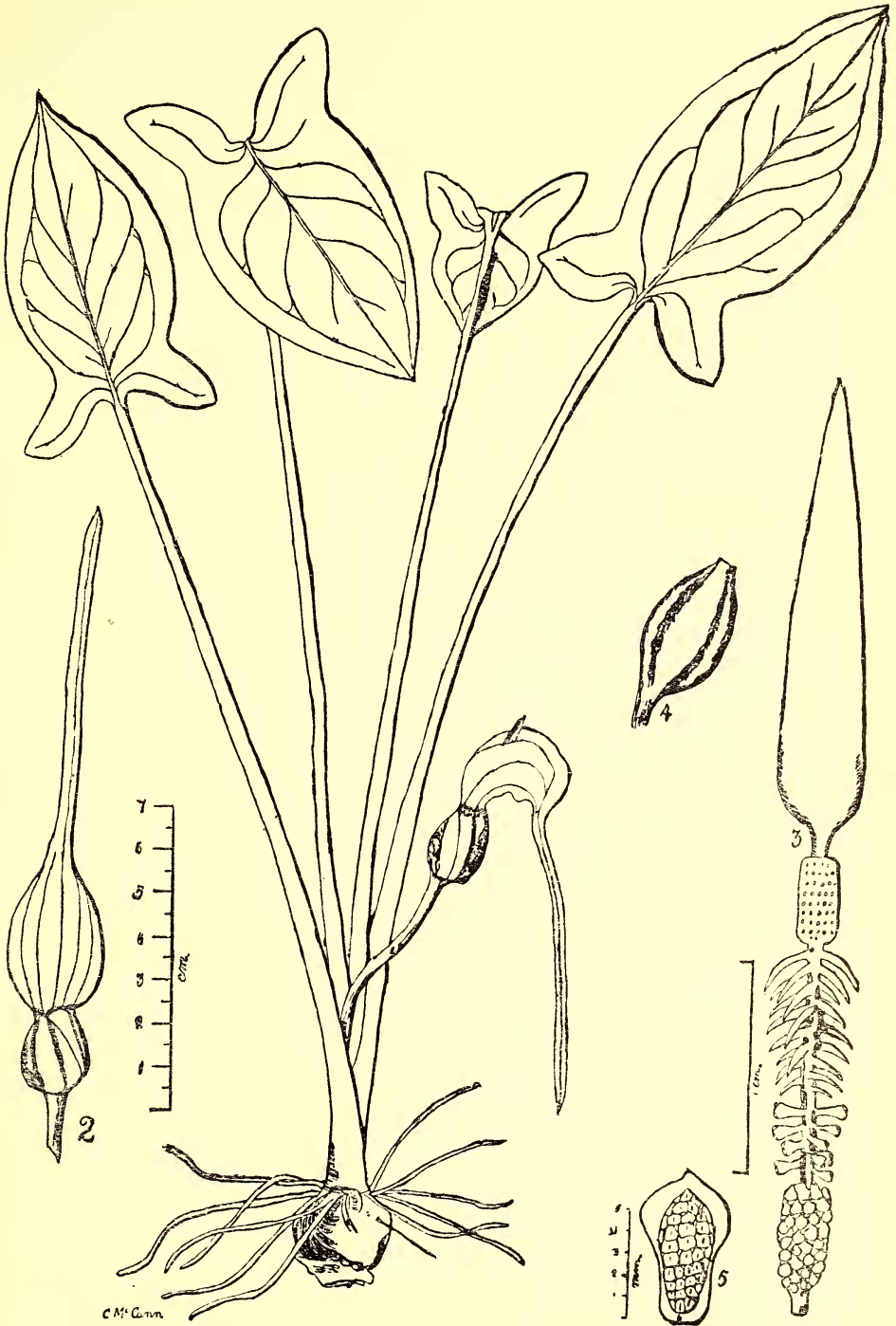
Description: Cke. ii, 822.

Locality: Konkan : (Stocks); Kalyan (Garade!); Roha (Damle 539!).—S. Konkan (Dalzell).—S. M. Country: Tavargatti, in shade of trees (Sedgwick 2618!).

Distribution: Apparently endemic.

Flowers: June 1902 (Roha); July 1905 (Kalyan); July 1917 (S.M. Country).

4. *Typhonium trilobatum* (Linn.) Schott in Wien. Zeitschr. iii, (1829) 72; Aroid. i, (1853) 12, t. 16.—For synonyms, see Hook. f. F.B.I. vi, 509.



Typhonium incurvatum, Blatter & McCann, sp. nov.

- 1. Plant.
- 2. Spathe.
- 3. Spadix.
- 4. Fruit.
- 5. Bacca.

B. Lower rudiments of sterile flowers near the female flowers

- | | | | |
|--------------------------|-----|-----|----------------------------|
| I. Pistils sub-4-seriate | ... | ... | 2. <i>T. indicum</i> . |
| II. Pistils uniseriate | ... | ... | 3. <i>T. uniseriatum</i> . |

1. *Therophonum minutum* (Willd.) Engl. Pflanzenr. iv, 23 F. (1920) 105.—*Arum minutum* Willd. Sp. Pl. iv, (1805) 484; Graham Cat. Bomb. Pl. (1839) 228.

Description: Tuber small, depressed, 1-2 cm. diam. Petioles 5-15 cm. long, narrowly sheathed up to the middle or beyond and pale rose coloured or fuscopunctate, above the sheath green; lamina hastate-triangular, subtrilobous, with the margin undulate, about 3-5 cm. long, front-lobe twice as long as the lateral ones, 2.5 cm. broad, all lobes sub-obtuse or shortly acuminate. Peduncle 3-10 cm. long; spathe whitish; tube about 1-2 cm. long, obtuse at the base or subtruncate; lamina oblong, subacute or shortly cuspidate, about 7-9 cm. long, 3-3.5 cm. broad, red, with the margin crisped-crenulate. Female inflorescence few-flowered; pistils subbiseriate; male inflorescence thinly cylindrical, 1-1.5 cm. long, separated from the female inflorescence by a naked interval of 2-4 mm. Rudiments of sterile flowers thin, subulate, 2-4 mm. long, occupying about 4 mm. at the base of the male inflorescence, others shorter, 1-2 mm. long, occupying 5-8 mm. above the male inflorescence, lilac like the male flowers. Appendix subcylindrical, about 1.5-3.5 cm. long, stouter below (3-4 mm. diam.), above slightly thinner, obtuse, black purple.

Var. Heynei, Engl. in DC. Mon. Phan. ii, (1879) 607; Pflanzenr. iv, 23 F (1920) 105, fig. 2, R and 15 A.F.—*Arum crenatum* Wight in Hook. Bot. Misc. ii, (1831) 100; Suppl. t. 3; Graham Cat. Bomb. Pl. (1839) 228.—*Typhonium crenatum* Schott Melet. i, (1832) 17.—*Therophonum crenatum* Bl. in Rumphia i, (1835) 128; Schott Aroid. i, (1853) 15, t. 21; N. E. Brown in Journ. Linn. Soc. xviii, (1880) 259. *excl. syn. T. Kleinii* Schott; Hook. f. F.B.I. vi, (1893) 512 *excl. syn. T. Kleinii*.

Description: A taller plant. Petioles up to 15 cm. long; lamina about 5 cm. long. Tube of spathe subtruncate at the base, up to 2 cm. long; lamina oblong, about 9 cm. long. Lower rudiments of sterile flowers forming a spike as long as the female inflorescence, the upper rudiments together with the fertile male flowers forming a spike as long as the female inflorescence. Connective of stamen shortly rostrate.

Locality: Bombay Pres. (Graham).

Distribution: Madras, Coromandel coast.

Var. Kleinii, Engl. in DC. Mon. Phan. ii, (1879) 607.—*Arum minutum* Willd. Sp. Pl. iv, (1805) 484; Grah. Cat. Bomb. Pl. (1839) 228.—*Typhonium minutum* Bl. in Rumphia i, (1835) 134.—*Therophonum Kleinii* Schott in Öesterr. bot. Zeitschr. viii, (1858) 3.—*T. crenatum* Schott Aroid. i, (1855) 15, t. 21.—*Nelenschena minor* Rheede Hort. Malab. xi, (1692) 33, t. 17.

Description: A smaller plant. Petioles 5 cm. long; lamina about 4 cm. long. Tube of spathe ovate, about 1 cm. long; lamina about 7 cm. long. Lower rudiments of sterile flowers forming a spike shorter than the female inflorescence, the upper rudiments together with the fertile male flower forming a spike about 6 times as long as the female inflorescence. Connective of stamens shortly rostrate.

Locality: Bombay Pres. (Graham).

Distribution: W. Peninsula of India. No definite locality.

2. *Therophonum indicum*, (Dalz.) Engl. in Pflanzenr. iv, 23 F. (1920) 107.—*Tapinocarpus indicus* Dalz. in Hook. Journ. Bot. iii, (1851) 346.—*Therophonum Dalzellii* Schott Aroid. i, (1853) 15, Syn. (1856) 21; Engl. in DC. Monogr. Phan. ii, (1879) 608; Hook. f. F.B.I. vi, (1893) 513; Cke. ii, 823.—*Tapinocarpus Dalzellii* Schott. Gen. Ar. (1859) t. 15.

Description: Tuber about 2 cm. diam. Leaves appearing with the flowers or a little in advance of them. Petiole 20-25 cm. long, vaginate for the third or fourth part of its length; lamina up to 20 cm. long, variable in breadth, elliptic, oblong or linear, acute or subobtuse, smooth and shining above, dull beneath, base rounded or hastate, or sagittate, front-lobe ovate-oblong to oblong, 4-5 cm. broad, lateral lobes oblong, usually only 3 leaves. Peduncle up to 20 cm. long, in fruit twisted and curved to the ground. Tube of spathe

subtruncate at the base, oblong, green when young, soon fading to white, 3 cm. long, 1.5 cm. wide; lamina lanceolate-oblong, long-acuminate, deep purple, rapidly fading, 15 cm. long, 2.5 cm. broad. Female inflorescence short, pistils sub-4 seriate, separated from the male inflorescence by an interval of 2.3-3 cm.; male inflorescence about 7 mm. long; rudiments of sterile flowers near the pistils, thinly subulate, about 4 mm. long, greenish yellow, a few short subulate rudiments above the male inflorescence and close to it. Anthers rosy purple. Ovaries whitish, with greenish yellow hairs on top, stigma purple-pink. Appendix of spadix deep crimson or purple, when young greenish yellow above, thinly cylindrical, about 15 cm. long, 1.5 mm. thick. Ovules 4-6, of which 1-3 are pendulous from the top of the cell of the ovary, the remaining ones basal, erect. Fruit angular, 4-5-seeded.

According to McCann the young leaves are entire, cordate, ovate or almost round, acuminate.—The tuber produces a number of young tubers from the upper side.

Locality: Konkan (Stocks, Dalzell); Vengurla (Dalzell); moist grassy places in S. Konkan (Dalzell and Gibson); Kalyan (Woodrow !); hill N.-W. of Bhandup, under shrubs and in open along aqueduct (McCann 694 !, 695 !); Bhandup (Blatter and McCann 26381 !, 26384 !).—*N. Kanara*: Karwar (Talbot 85 !, 1890 !).

Distribution: Apparently endemic.

Flowers: June 1917, July 1929 (Bhandup); June 1883, Aug. 1889 (Karwar).

3. *Theriophonum uniseriatum*, Blatter & McCann, *sp. nov.* [*Aracea*, *accedens ad T. indicum* Engl., a quo tamen differt pistillis uniseriatis, florum sterilium rudimentis 1 cm. ab inflorescentia feminea remotis, aliis rudimentis absentibus, inflorescentia mascula multo longiore].

Tuber circa 2 cm. diametens. Folia cum floribus coactanea. Foliorum petiolus usque 25 cm. longus. Lamina usque 16 cm. longa et 15 cm. lata ubi latissima, late ovata et irregulariter hastata vel oblongo-cordata. Pedunculus crassus, usque 13 cm. longus. Spatha usque 20 cm. longa; tubus pallide viridis quando juvenis, basi convolutus; lamina oblongo-lanceolata, intus nigro-purpurea, extus olivacea. Spadicis inflorescentia feminea brevis, ca. 5 mm. longa, obovoidea, pallide viridis; pistilla uniseriata; stigma latum pilis minutis crystallinis coopertum. Florum sterilium rudimenta plura 1 cm. ab inflorescentia feminea remota, tenuiter subulata, erecta vel ascendente, 3-4 mm. longa, flavo-brunnea, alia rudimenta nulla. Inflorescentia mascula 2 cm. altius in spadice posita, 12 mm. longa; antherae roseo-purpurascens, thecis poro apicali aperientibus. Axis inter flores femineos et steriles rubro-purpurea inter steriles et masculas nigro-purpurea. Appendix teres, elongata, non stipitata, versus apicem attenuata, 8 cm. longa, basi 3 mm. diametens, flava quumdiu inclusa in spatha, deinde purpurea.

Locality: *N. Kanara*: Karwar (T. R. D. Bell 1666 !).

Flowers: End of July 1924.

7. SAUROMATUM Schott (Cke. ii, 824).

Species 4.—Palæotropics.

1. *Sauromatum guttatum* (Wall.) Schott Melet. i, (1832) 17; Hook. f. F.B.I. vi, (1893) 508 emend.; Cke. ii, 824; Engl. Pflanzenr. iv, 23 F (1920) 123, fig. 18 A-L.—*Arum guttatum* Wall. Pl. As. Rar. ii, (1831) 10, t. 115.—*Sauromatum simlense* Schott in Osterr. bot. Zeitschr. viii, (1858) 263.—For further synonyms see Hook. f. *l.c.*

Description: Tuber very large, globose, up to 15 cm. diam., producing buds from the top and sides. Leaf solitary. Petiole up to 50 cm. long, very stout at the base, up to 2 cm. diam., attenuate upwards, spotted or not; lamina in outline rotund-cordate, pedate-palmate to pedatifid or pedatisect; segments oblong or oblong-lanceolate, acuminate, the intermediate one up to 25 cm. long, 15 cm. broad, the lateral ones on each side 3-7, getting gradually smaller; primary lateral nerves about 5-6 on each side, distant from each other 1-1.5 cm., and secondary parallel nerves united into an intramarginal nerve 2-3 mm. from the margin. Peduncle measuring scarcely 5 cm. beyond the cataphylls and 2 cm. diam., pale green, cataphylls few, soon withering, 5-10 mm. long, triangular, acute, broad at base. Spathe large, very variable in size; tube 5-10 cm. long, slightly ventricose below, above subcylindric, about

2-2.5 cm. wide; lamina in æstivation convolute into a purple-livid cylinder which is tumid at the base, then straight-ascending and slender acuminate, when expanded oblong-lanceolate, very large, 30-70 cm. long, 8-10 cm. broad, lower margin irregularly sinuate-repand, upwards gradually narrowed into an acumen, purple below, light green in the middle and above, often with angular dark purple spots or blotches, finally recurved from the middle, descending and touching the ground. Spadix about $\frac{3}{4}$ shorter than the spathe. Female inflorescence cylindric, about 2-2.5 cm. long, 1.5 cm. diam.; rudiments of sterile flowers stipitate-claviform, spreading, inserted immediately above the female flowers; male inflorescence 1.5 cm. long, distant from the female inflorescence by an interval of about 6 cm. which bears some scattered minute, acute, aculeiform rudiments; appendix cylindric, obtuse, about 30 cm. long, 1 cm. diam., pale fuscous or purplish. Pistils very numerous, small, obovoid, subtruncate at top, 2-ovulate. Stamens with very short filaments.

Note: Sometimes only the central leaflet develops.

Hallberg found a specimen at Bandra (July 1917) with two quite green leaves, one sheathed by the other. The inner one was the larger and showed a central channel in which there was a thick laminar outgrowth, probably the remains of the free basal margin of the leaf. Inside the channel there was a leaf-embryo with a thick conical petiole and a minute bifid lamina which was decomposing. The whole may have been due to the leafing of the peduncle, the second leaf being the spathe and the third a carpel.

For some biological notes on this species and a good illustration of the leaf we refer to C. McCann in this Journal, vol. xxxiv, (1930) 518, fig. 1.

Locality: Gujarat: Surat (Herb. R. E. P. Calcutta 20,332).—Konkan: (Stocks); Versova (Blatter & McCann 26373!); Thana Dist. (Ryan); Bhandup (Blatter & McCann 26383!); Sion Hill (McCann 995!); Uran (Hallberg and McCann!); Salsette (McCann!). *Deccan*: Junnar (Paranjpye!). —*W. Ghats*: Panchgani (Blatter P 22!); Lonavla (Woodrow!); Khandala (Blatter & McCann!). *S. M. Country*: Astoli (Sedgwick 2624!).

Distribution: Punjab, Gangetic Plain, Himalaya from Simla to Nepal, Chota Nagpur, Gujarat, Konkan, Deccan, W. Ghats, Burma, Sumatra.

Flowers: Jan. 1917 (Uran); March 1911 (Junnar, Thana, Bhandup); June 1917 (Bhandup, Panchgani); July 1925 (Panchgani).

Fruit: Sept. 1917 (Versova).

8. AMORPHOPHALLUS Blume (Cke. ii, 825).

Species about 90. Tropical Asia and Africa.

Cooke gives 3 species: *A. bulbifer*, *A. campanulatus*, and *A. commutatus*. We add *A. silvaticus* and *A. Hohenackeri*.

A. Leaves not bulbiferous

- | | | | |
|---|-----|-----|-----------------------------|
| I. Spathe greenish pink, 15-25 cm. broad; appendix irregularly amorphous, dark purple | ... | ... | 1. <i>A. campanulatus</i> . |
| II. Spathe brownish purple, 5-10 cm. broad, appendix terete, smooth, cream-coloured | ... | ... | 2. <i>A. commutatus</i> . |
| III. Spathe white inside, outside green, white-striate, towards the margin white-spotted, 3 cm. broad; appendix elongate-conical, pale straw-coloured, flexuose | ... | ... | 4. <i>A. silvaticus</i> . |
| IV. Spathe 3 cm. broad; appendix 3.5-4 cm. long, 1.5 mm. diam., elongate, thin, subulate, straight | ... | ... | 5. <i>A. Hohenackeri</i> . |
| B. Leaves bulbiferous | ... | ... | 3. <i>A. bulbifer</i> . |

PLATES V & VI.

1. *Amorphophallus campanulatus*, (Roxb.) Bl. in Decne in Nouv. Ann. Mus. Par. iii. (1834) 366 *excl. syn. praeter* Roxb.; Cke. ii, 825; Engler Pflanzenr. iv. 23C (1920) 76. For synonyms see Hook. f. F.B.I. vi, (1894) 513.

Description: Cke ii, 825. A more complete description by Khadilker in Journ. Ind. Bot. ii, (1921) 55.



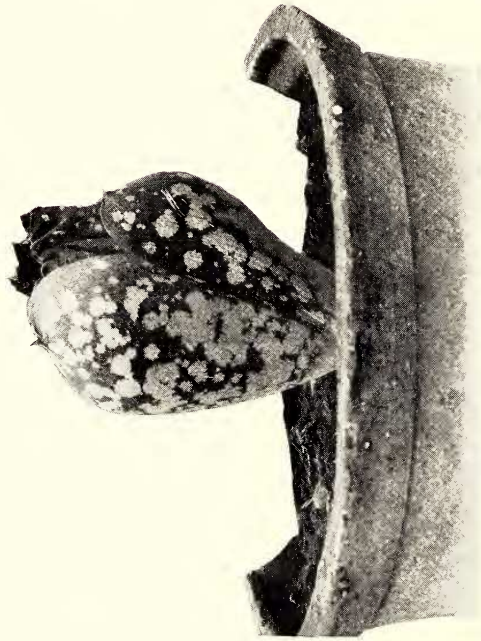
1. Open flower of *Amorphophallus campanulatus*, Blume.

(4 days later than Pl. VI, 1.)

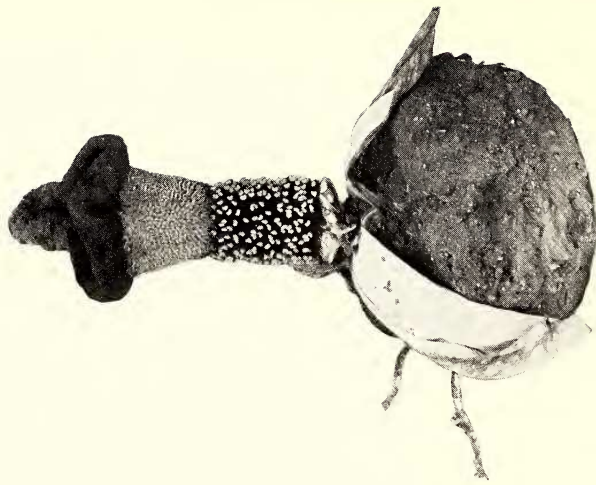


2. Open flower of *Amorphophallus campanulatus*, Blume.

(Photos by C. McCann.)



1. Bud of *Amorphophallus campanulatus*, Blume.



2. Spadix of *Amorphophallus campanulatus*, Blume.

(Photos by C. McCann.)

For biological notes see McCann in this Journal, vol. xxxiv, (1930) 520.

Cataphylls usually 2, greenish, obovate, tip emarginate, apiculate, about 13 cm. long.

The bad smell is restricted to the appendix of the spadix (McCann).

Appendix of spadix crimson lake when fresh, turning purple and eventually deep brown. Colour of spathe very variable, but usually has large whitish blotches.

Locality : *Konkan* : Borivli to Kanari Caves (McCann 1638 !); Jogeshwari in Salsette (McCann !); common throughout Salsette (McCann). *S.M. Country* : Londa (Sedgwick 2538 !). Cultivated in gardens in Gujarat, Bombay and Deccan.

Distribution : Tropical Himalaya, plains from the Punjab to Bengal and down to Ceylon, Assam, Burma, Andamans, Malay Peninsula, Siam, Malaya, New Guinea, Melanesia.

Flowers : May 1917 (Londa); 15th June 1930 (Kanari Caves); June 1930, July 1928 (Jogeshwari); leafed in 1829.

2. *Amorphophallus commutatus*, Engl. in DC. Mon. Phan. ii, (1879) 319; Cke. ii, 826. *Conophallus commutatus* Schott in Bonpl. (1859) 28.

Description : Cke. ii, 826. See also Lisboa in this Journal x, (1896) 527.

For biological notes see McCann in this Journal xxxiv. (1930) 520.

The following abnormalities were observed by Hallberg in specimens from Mulgaum, Salsette : Leafy carpels, a pedunculate spadix, appendix branched at base and on the same plant a number of cream tubercles amongst the green ovaries. McCann found a specimen with the appendix branched at the tip.

Locality : *Konkan* : (Stocks, Graham); Ambenali (McCann !) Borivli to Kanari Caves (McCann 1244 !, 1641 !, 1642 !); hills N.-W. of Bhandup (McCann 707 !, 708 !, 709 !, 710 !, 711 !); Bhandup (B'atter 26382 !); in forest near foot of Kanari Caves (McCann 616 !, 617 !); foot of hills W. of Mulland (McCann 878 !); Vikroli (McCann !); S. Konkan (Dalzell and Gibson); Bombay (Hallberg !); Kurla (Gammie 15118 bis !); Marmagao (Woodrow !); Bassein (Ryan 1687 !); Savantvadi (Dalgado) — *W. Ghats* : From Bombay to Kumpta (Lisboa !); Matheran (Cooke !); Khandala (McCann !). — *Deccan* : Ganeshkhind Bot. Garden (Paranjpe !); Poona (Herb. Calc.). — *S. M. Country* : Astoli (Sedgwick 2615 !); Sakharpa, Kolhapur Ratnagiri Road (Bhide !); Belgaum (J. H. Burkill). — *N. Kanara* : Karwar (Bell 6140 bis !); in forests (Bell 6176 !); Bellkerry (Talbot 492 ! in Herb. Sedgwick).

(The last mentioned sheet bears the name *Raphiophallus Hohenackeri* Schott. This is a synonym of *Amorphophallus Hohenackeri* Engl. The specimen however is evidently *A. commutatus*.)

Engler mentions the same number by Talbot in the Calcutta Herbarium under *A. Hohenackeri*. It is quite possible that two different species were distributed under the same name.

Distribution : Apparently endemic in the Bombay Pres.

Flowers : April 1901 (Savantvadi); May 1908 (Ganeshkhind, Matheran); June 1883 (N. Kanara); June 1919 (Karwar); June 1917 (Bhandup); June 1930 (Borivli to Kanari Caves); June 1929 (Foot of Kanari Caves); July 1928 (Vikroli); July 1929 (Bhandup).

Fruit : June 1917 (Bhandup); Aug. 1929 (N.-W. of Mulland); Sept. 1903 (Bassein); Oct. (Ambenali); Nov. 1902 (Belgaum).

Uses : The unopened inflorescence is eaten as a vegetable.

3. *Amorphophallus bulbifer*, (Roxb.) Bl. in Rumphia i, (1835) 148; Cke. ii, 825. — *Arum bulbiferum* Roxb. Fl. Ind. iii, (1832) 510; Bot. Mag, t. 2072, 2508; Engl. Pflanzenr. iv, 23 C (1911) 98. — *Pythonium bulbiferum* Schott Melet. (1832) 18.

Description : Tuber about 5-8 cm. diam., subglobose. Petioles up to 1 m. long, 1.5-3 cm. diam., smooth, dirty or olivaceous green, with paler irregular or linear spots; lamina 3-sect, bulbiferous at the branchings of the ribs and nerves; primary lateral segments 20-30 cm. long, dichotomous, secondary segments pinnatisect, rarely bipinnatisect, few-jugate, lower segments 4-6 cm. long, 3-4 cm. broad, ovate, upper ones 10-12 cm. long, 6-7 cm. broad, oblong-lanceolate, all long-acuminate. Peduncle 20-30 cm. long, 1-1.5 cm. thick, nearly quite cylindrical all the way up, quite smooth, dark olive green with numerous narrowly oblong, sometimes crowded greyish blotches throughout its length, these blotches having a pinkish shade below in fresh specimens and a greenish shade towards the top of the peduncle, being about 2 cm. in length,

sometime coalescent, sometimes, especially upwards, shorter and roundish, all of them with irregular edges. Spathe 10-12 cm. long, 10 cm. broad when expanded, sessile, long-conical before opening, with a small apiculus at top, longitudinally many-veined, the veins towards the margins wider apart and net-veined between, delicate olive green, very light in shade, with many roundish nearly white blotches throughout which are not large, often coalescing and with a pinkish shade towards the base in fresh specimens; inside the spathe is a very delicate shell pink at the base, and in the middle gradually passing into the light olive green of the outside upwards and towards the margins; the veins in the green part always thinly darker. Spadix slightly shorter than the space, about 12 cm. long, shortly stalked, (about 12 mm.), the stalk very delicate dull olive green with somewhat obscure, round, whitish blotches, followed by 5 or 6 rows of female flowers, occupying a space of 1.5-2 by 1.5 cm.; the rows not regular, the lower flowers more developed and more separated from each other than those towards the top which are crowded together forming a mass of stigmata, the former squat pear-shaped, deep red in colour, surmounted by the shortly and thickly stalked stigmata which lean upwards, are circular-convex or nearly disk-shaped, the surface often being uneven; stigma yellow when fresh and still in the spathe, changing to green later on. The male flowers follow immediately after the females without an interval of any kind and are crowded together, occupying a space of 2.5 by 1.5 cm., very delicately shell pink like the inside of the spathe; anthers sessile, generally 5-sided from being so crowded, otherwise globose where free (1 or 2 towards the base), free, with 2 parallel impressed pores on their upper surface. Appendix 5-8 cm. long, 2-2.5 cm. diam., conical, the thickest part about 20 mm. above the base, extreme base about 18 mm. diam., the tip very bluntly rounded, about 8 mm. diam., colour a smooth silky white with a pink tinge, the surface dull but not at all uneven.

For morphological and biological notes see McCann in this Journal xxxiv, (1930) 519.

Localities: Konkan: Ambenali (McCann!); Borivli to Kanari Caves (McCann 1255!, 1252!); hills W. of Mulland (McCann 883!, 884!); hills near Ghorbunder, Salsette (McCann!).—*S. M. Country*: Devarayi (Sedgwick 4124!, 4041!).—*N. Kanara*: Forests (Bell 6108!); Yellapur (Bell 6080!); Pattanpar (Bell!).

Distribution: Chota Nagpur, Bengal, Sikkim, Khasia Hills, Assam, Burma.

Flowers: June 1915 (Pattanpar); June 1918 (S. M. Country); June 1919 (Yellapur).

Fruit: 15th Sept. 1929 (Kanari Caves); Oct. 1930 (Ambenali).

4. *Amorphophallus siivaticus*, (Roxb.) Kunth Enum. iii, (1841) 34; Engler Pflanzenr. iv, 23C (1911) 103, fig. 35 A-E. *Arum silvaticum* Roxb. Fl. Ind. iii, (1832) 511; Wight Ic. t. 802. *Synantherias silvatica* Schott Gen. Ar. (1858) t. 28; Hook. f. Bot. Mag. t. 7190 et F.B.I. vi, (1893) 518. *Amorphophallus zeylanicus* Bl. in Rumphia i, (1835) 148.—*Brachyspatha zeylanica* Schott Syn. (1856) 36.

Description: Tuber 5-6 cm. diam., slightly depressed. Petioles long, smooth, green; lamina 3-sect, primary lateral segments dichotomous, secondary ones pinnatisect, tertiary ones lanceolate or obovate, acuminate, decurrent with the exception of the lowest. Peduncle about 20-25 cm. long, 1 cm. diam. Spathe about 5 cm. long, 3 cm. broad, erect, ovate, in the middle convolute, inside white, greenish at the apex, outside green, white striate, towards the margin white-spotted. Spadix stipitate, up to 3 times as long as the spathe. Female inflorescence 1.5 cm. long, interval bearing the neuter flowers 1.5 cm. long; male inflorescence 2-2.5 cm. long, 4 mm. diam., appendix 10-15 cm. long, 5 mm. thick below, elongate-conical, flexuose, above the inflorescence slightly thickened, longitudinally sulcate, pale straw-colour. Stainens short or disposed round a naked disk, or irregularly scattered; anthers subsessile, the thin connective slightly raised above the lobes. Neuters uniseriate, oblong, depressed, rugose. Ovary 1.5 mm. long, globose, 2-locular, loculi 1-ovuled, ovule attached to the middle of the dissepiment; style 0.5 mm. long; stigma slightly 3-lobed.

Locality: *N. Kanara*: Bedoli (Herb. Econ. Bot. Poona 1!).

Cooke (ii, 829) excludes this species, because Engler gives Bombay as locality of a specimen which in reality refers to a plant originating from the Nilgiris and Coorg. In the meantime a specimen has been gathered in *N. Kanara*,



Del C. McCann.

Leaf of *Amorphophallus commutatus*, Engl.

Distribution : N. Kanara, Nilgiris, Malabar, Circars, Ceylon in dry regions.
Flowers : Sept. 1893.

5. *Amorphophallus Hohenackeri*, (Schott) Engl. and Gehrm. in Engler Pflanzen. iv, 23C (1911) 103, fig. 35, f-m.—*Raphiophallus Hohenackeri* Schott Gen. Ar. (1858) t. 27.—*Hydrosme Hohenackeri* Engl. in Engl. and Prantl Pflanzenf. ii, 3 (1887) 128 *ibid.* Nachtr. i, (1897) 59.

Description : Tuber 2-3 cm. diam. Petiole 20-30 cm. long, 2 cm. diam., lamina 3-sect; primary segments 10-15 cm. long, dichotomous, secondary segments scarcely 10 cm. long, pinnatisect, tertiary segments 2-6 cm. long, 1.5-3 cm. broad, oblong, acute, cuneately decurrent, lateral nerves numerous, parallel, spreading, united into an intramarginal nerve not far removed from the margin. Peduncle scarcely 30 cm. long, thin. Spathe about 8 cm. long, 3 cm. broad, tube convolute, open above; lamina erect, lanceolate, acute. Spadix short-stipitate, slightly shorter than the spathe, or as long; female inflorescence 1.5 cm. long; neuters gibbous, occupying the 5 mm. long space between the female and male inflorescences; male inflorescence 1 cm. long. Appendix 3.5-4 cm. long, 1.5 mm. thick, elongate, thin, subulate. Anther-lobes obovoid, with 2 confluent pores at the apex forming a transverse small slit. Pistil obpyramidal-tetragonous, 3-locular; stigma sessile, broad, discoid, slightly 3-4-lobed.

Locality : N. Kanara (Talbot 492 ex Engler).

Distribution : Mangalore.

Flowers : June 1883.

9. COLOCASTA Schott.

Tall herbs, tuberous or with a stout short caudex, flowering and leafing together. Leaves with a stout petiole; lamina peltate, ovate-cordate or sagittate-cordate. Spathe with a stout peduncle; tube ovoid or oblong, convolute, accrescent in fruit, finally irregularly lacerate; lamina oblong or narrowly lanceolate, deciduous. Spadix shorter than the spathe, stout or slender; female inflorescence short, male inflorescence long, cylindric, usually interposed neuters between the two. Appendix erect, elongate-conical or fusiform, subulate or abbreviate, mucroniform. Male flowers 3-6-androus. Female flowers 3-4-gynous; ovary ovoid or oblong, 1-locular; ovules several or many, biseriate; style 0 or short in the beginning, later on 0; stigma depressed-capitate, very shortly 3-5-sulcate. Berries obconic or oblong, many-seeded. Seeds oblong, sulcate. Albumen copious; embryo axile.

Species 7.—Tropical Asia.

Only one species grows in the Presidency, known in Indian Floras under the name *Colocasia antiquorum*, which name has to be changed into :

1. *Colocasia esculenta*, (Linn.) Schott Melet. i, (1832) 18; Kunth Enum. iii, (1841) 37.—*Arun esculentum* Linn. Sp. Pl. (1753) 965, ed. 2 (1763) 1369. *Caladium esculentum* Vent. Hort. Cels. (1800) 30.—*Colocasia antiquorum* Schott l.c.; Hook f. F.B.I. vi, (1893), in Bot. Mag. (1894) t. 7364.—For synonyms see Hook. f. l.c.

Description : Stem above ground 0, or slightly swollen at the base of the leaf-sheaths, arising from a hard tapering rhizome or in cultivated forms a tuberous rhizome, suckers and stolons sometimes present. Petiole erect, up to 1.2 m. long; lamina thinly coriaceous, peltate-ovate, cordate at the base, up to 50 cm. long, rarely longer, with a triangular sinus cut $\frac{1}{2}$ to half way to petiole, with a dull, not polished surface above, paler or coloured beneath, but rarely very glaucous. Peduncle much shorter than the petiole; spathe pale yellow, 15-35 cm. long; tube greenish, oblong; lamina narrowly lanceolate, acuminate, convolute, never widely open, curved slightly backwards in flower. Spadix much shorter than the spathe, rather slender. Female inflorescence as long as the sterile male inflorescence. Appendix much shorter than the inflorescence, style very short. Stigma discoid.

Locality : *Konkan* : Mumbra (Sedgwick 7658 !); Condita (Blatter and McCann 26375 !); Borivli to Kanari Caves (McCann 1250 ! 1251 !); hills W. of Muilund (McCann 880 ! 881 !); hills N.-W. of Bhandup (McCann 702 !).—*Deccan* : Satara (Herb. St. X. C. 26389 !).—*N. Kanara* : Nagayali (Sedgwick 2929 !). Widely spread throughout the heavy rainfall area (Sedgwick).

There is not the slightest doubt, that the plant is growing wild in many parts of the Presidency, especially in N. Kanara. Otherwise cultivated.

Distribution: Wild and cultivated throughout the hotter parts of India and Ceylon. Cultivated in all hot countries.

Flowers: July 1917 (Condita); Aug. 1929 (Mullund); Sept. 1917 (Nagayali, Condita); Sept. 1920 (Mumbra).

Fruit: Aug. 1929 (Mullund); Sept. 1929 (Borivli to Kanari Caves).

10. ARIOPSIS Nimmo (Cke. ii, 827).

Species 1—India.

1. *Ariopsis peltata* Nimmo in J. Grah. Cat. Bomb. Pl. Addend. (1839) 252; Hook. f. in. Bot. Mag. t. 4222 et F.B.I. vi, (1893) 519; Cke. ii, 827; Engl. Pflanzenr. iv, 23E (1920) 130.—*A. prolanthera* N. E. Br. in Rep. R. Gard. Kew (1877) 57.—*Remusatia vivipara* Wight Ic. iii, (1847) t. 900.

Description: Cke. ii, 827.

The tubers are subglobose or ovoid, 2–4 cm. diam. The lamina of the leaf up to 25 cm. across.

Vern. name in the Konkans; Khadaktiri.

Locality: Konkans (Stocks); hills N.-W. of Bhandup in forests (McCann 696!, 701!, 703!); Borivli to Kanari Caves (McCann 1203!); Bassein range, Thana Dist. (Ryan!); Roha (Damle 542!).—*W. Ghats*: Khandala (Hallberg!); Panchgani (Blatter!); Ambe Ghat (Shevade!).—*N. Kanara*: Karwar (Bell 6106!, 4076!, Talbot!); Karwar and Belekeri (Talbot 494!).

Distribution: Subtropical Himalaya from Nepal to Sikkim, Assam, Burma, Konkans, W. Ghats from Bombay to Travancore.

Flowers: May 1917 (N. Kanara); June (N. Kanara); 7th July (Borivli to Kanari Caves).

Fruit: May 1917 (N. Kanara); June (N. Kanara); July 1929 (Borivli to Kanari Caves).

11. REMUSATIA Schott.

Species 2.—Tropical Africa and Indo-Malaya.

1. *Remusatia vivipara* (Lodd.) Schott Melet. i, (1832) 18; Gen. (1858) t. 36; Cke. ii, 828; Krause in Engl. Pflanzenr. iv, 23E (1920) 16, fig. 4, A-M.—*Caladium viviparum* Lodd. Bot. Cab. (1820) t. 281.—*Colocasia vivipara* Thw. Enum. (1864) 336.—*Arum viviparum* Roxb. Hort. Beng. (1814) 65, Fl. Ind. iii, (1832) 496; Wight Ic. iii, (1844) t. 798.—Rheede Hort. Mal. xii, (1703) t. 9.

Description: Cke. ii, 828.

Locality: Konkans: Both Konkans (Nimmo); clefts of trees in Ghat jungles (Dalzell and Gibson); Neral (Bhiva!); Bassein (Ryan 1544 bis!) Ambenali (McCann!).—*W. Ghats*: Khandala (Hallberg!, Chibber 53!); Duke's Nose near Khandala, on trees (Meebold ex Engler); very common at Khandala (McCann); Lonavla (Woodrow!); Koina Valley below Mahableshwar (Cooke!); Panchgani, cliffs of Tableland (McCann 2867!, Blatter!).—*S. M. Country*: Astoli, on trees and evergreen (Sedgwick 2649!).—*N. Kanara*: Sulgeri (Bell 4279); Goona (Talbot!), Yellapur (Talbot!).

Distribution: Subtropical Himalaya from Kumaon to Sikkim, Khasia Hills, Burma, Chota Nagpur Konkans, W. Ghats, N. Kanara, Mysore, Ceylon, Cochin-China, Java, tropical Africa.

Flowers: Feb. 1890 (N. Kanara).

Fruit: July 1917 (S. M. Country).

12. RHAPHIDOPHORA Hassk. (not in Cke.).

Creeping or scandent, rooting on trees. Leaves distichous. Petiole geniculate, more or less vaginate. Lamina lanceolate or oblong, more or less oblique, entire or pinnatifid or pinnatisect, often very large; primary nerves many, secondary branching. Spathe ovate, acuminate, deciduous. Spadix stipitate, dense-flowered, shorter than the spathe. Flowers hermaphrodite or few female. Perianth 0. Stamens 4; filaments linear, suddenly narrowed into a thin acuminate connective; anthers terminal. Ovary long, sub-tetragonous- (or hexagonous-) prismatic, truncate, sub-bilocular, cells several-ovuled, ovules many, parietal. Style almost absent or elongate-conical;

stigma elliptic or oblong. Berries confluent and their tissue loaded with intercellular needles. Seeds oblong, attached to a long funicle. Albumen copious. Embryo axile, erect.

Species 60.—Indo-Malayan.

1. *Rhaphidophora pertusa* (Roxb.) Schott in Bonpl. v, (1857) 45; Hook. f. F. B. I. vi, (1893) 546; Engler Pflanzenr. iv, 23B (1908) 47.—*Pothos pertusus* Roxb. Fl. Ind. i, (1832) 455; Wight Ic. t. 781.—*Scindapsus pertusus* Schott Melet. i, (1832) 21.—*Rhaphidophora lacera* Hassk. Kat. Bog. (1844) 58; Pl. Jav. Rar. (1848) 155.—*Scindapsus peepla* Thw. Enum. (1864) 336.—Rheede Hort. Mal. xii, t. 20, 21.

Description: A tall climber; stem stout, 2.5-3.5 cm. diam.; internodes 5-8 cm. long. Petiole deeply channelled above, 15-30 cm. long, when young with a membranous sheath 12-14 mm. wide below, narrower upwards; lamina herbaceous, broadly ovate in outline, shortly cuspidate at the apex, at the base slightly cordate or subtruncate, unequal-sided, 20-45 cm. long, 15-30 cm. broad, on the narrower side entire or pertuse, holes mostly oblong, the other side pinnatifid; segments 3-4, of equal length, inequilateral, broadened towards the apex, truncate, upper margin obliquely and upwards falcate-acuminate, confluent below; adult lamina pinnatifid, on each side 5-11 linear, obliquely falcate-acuminate segments. Peduncle short, terete, 5-8 cm. long. Spathe fleshy, yellow, ovate-oblong, 10 and more cm. long including the acumen which is 2 cm. long. Spadix sessile, cylindrical, 8-9.5 cm. long and about 1.5 cm. diam. Pistils prismatic, 5-6 mm. long; style tetragonous, very short; stigma subsessile.

Locality: N. Kanara: Goodehalli, in evergreen (Sedgwick 6810!).

Distribution: N. Kanara, Nilgiris, Coromandel, Ceylon, Java.

13. POTHOS Linn. (Cke. ii, 828).

Species about 60.—Indo-Malayan, Madagascar.

1. *Pothos scandens* Linn. Sp. Pl. (1753) 963; Bot. Reg. t. 133; Hook. Ic. Pl. ii, t. 175. Cke. ii, 828 (*partim*); Engler Pflanzenr. iv, 23B (1905) 26.—*P. exiguiflorus* Schott Aroid. i, (1853) 21, t. 41.—*P. fallax* Schott Prodr. (1860) 560.—*P. decipiens* Schott in Bonpl. (1859) 165.

We have followed Engler in separating *P. scandens* Roxb. and *P. Roxburghii* De Vriese from *P. scandens* as conceived by Hook. f. in F. B. I. vi, 551 and Cooke Fl. Bomb. ii, 828. The description, therefore has to be changed.

Description: Internodes of branchlets 1.5-2 cm. long. Petiole more or less cuneate, 4-5 cm. long, more than 7-9 mm. broad, with rotundate auricles, more or less shorter than the lamina; lamina lanceolate obtuse at the base, gradually narrowed towards the apex, acute, 6-8 cm. long, 1.5-2 cm. broad. Peduncles short, together with the spadix scarcely reaching $\frac{1}{2}$ of the petiole, 1.5-2.5 cm. long; upper cataphylls ovate, acute, about 0.5 cm. long. Spathe ovate or ovate-oblong, apiculate, 7-8 mm. long. Spadix slightly longer than the stipes, 6-7 mm. long about 4 mm. diam. Berries oblong-ovoid, almost 1 cm. long, 5-6 mm. diam.

Locality: *Konkan*: (Stocks); in dense jungles (Graham); jungles of Goa (Lush); Marmagao (Bhiva!).—*W. Ghats*: Ghat jungles (Dalzell & Gibson); Amboli (Gammie 15022!).—*N. Kanara*: (Chibber!); Devimani Ghat (Kulkarni!); Castle Rock (Gammie 15552! Bhide!); Yellapur (Talbot 4433!); Sumpkhund (Talbot 3692!); Kadgal (Woodrow); Anmod (Sedgwick 3217!); Guddehalli, Karwar (Sedgwick 6785).—Very common in N. Kanara (McCann).

Distribution: Konkan, W. Ghats to Travancore and Ceylon, Sylhet, Assam, Khasia Hills, Chittagong, Andamans, Nicobars, Malay Peninsula, Siam, Cochinchina, Tonkin, Malay Archipelago to the Philippines.

Flowers: Feb. 1905 (N. Kanara); June 1902 (Castle Rock).

Fruit: May (N. Kanara); Nov. 1908 and 1910 (N. Kanara).

(To be continued)